Attachment 4

DRAFT TWO – 11/22/05

CalPERS

Alternative Investment (AIM) Program Benchmark

Russell Investment Group

Executive Summary

Benchmarking is not an exact science, and when it comes to benchmarking private equity programs, the task becomes even more challenging. The long-term, illiquid nature of the investments makes common benchmark methodologies used for liquid asset classes difficult to apply. CalPERS has periodically reviewed its benchmark methodology and construction for the Alternative Investment Management (AIM) Program, and has elected to address it again as the portfolio continues to mature. Russell Investment Group has been engaged to conduct this review.

Currently, CalPERS is utilizing a two-tier approach for evaluating the AIM Program's performance. The first benchmark is the long-term performance objective of the program: CalPERS Custom Wilshire 2500 Index plus a 500 basis points return premium smoothed over rolling ten-year periods. The rationale behind such a benchmark is that it reflects the opportunity cost of investing in alternative investments; i.e., where the money would be invested if not in private equity. As such, it is an appropriate way to measure the impact of the strategic decision to establish the AIM Program.

The second benchmark measures the short-term performance objective of the program. The Venture Economics Information Services (Venture Economics) Young Funds Universe median returns by vintage year are utilized to benchmark the AIM Program's investment performance versus the backdrop of available market opportunities. The young funds are defined as the first four years of each individual partnership and the partnership composite portfolio. The rationale behind this second benchmark is that it measures the short-term effectiveness of the program relative to the best available proxy for what might be considered achievable during this period.

Russell has evaluated CalPERS benchmark and examined other alternatives, arriving at the following conclusions and recommendations:

- CalPERS' two benchmark approach is a rational approach to a challenging exercise. The two benchmark methodology should be maintained as it allows the Program to measure the impact on the System's asset allocation decision and to evaluate the implementation effectiveness of the Investment Staff.
- The individual components and focus of each of the two benchmarks can be modified to better reflect the objectives and the maturing portfolio
    - The liquid market index for the long-term benchmark should reflect the actual source of funds. The allocation for private equity came from both domestic and international equity, so this should be reflected in the benchmark.
    - The 500 basis points premium over liquid equities is significant and a reduction to 300 basis points should be considered.
    - The short-term objective should be modified to reflect a peer relative objective. The program is beginning to mature, and the young fund comparison can be replaced by a pooled composite return of the Venture Economics universe reflecting both short and longer term horizons.

CalPERS

Alternative Investment Management (AIM) Program Benchmark Recommendation

Benchmarking: Overview

The CFA Institute (CFAI) provides a general benchmark definition as, "An independent rate of return (or hurdle rate) forming an objective test of effective implementation of an investment strategy". Benchmarks typically take the form of a well recognized published index, a composite of indexes or asset classes, or a peer universe of similar investments or funds.

Not all benchmarks are created equally, and the CFAI has provided a list of criteria that should be present for a good benchmark.

1) *Representative of the asset class or mandate* – The benchmark holds the securities that are likely to comprise the majority of the portfolio.
2) *Investable* - The constituents of the benchmark are available for investment, and investors are able to replicate or purchase a passive alternative
3) *Constructed in a disciplined and objective manner* – The construction methodology is clearly established and based upon objective, not subjective rules
4) *Formulated from publicly available information* – The benchmark methodology and holdings are transparent
5) *Acceptable by the manager as the neutral position* – The benchmark represents the true habitat of the manager's investment process for portfolio
6) *Consistent with underlying investment status* – The benchmark is a good fit with the investor objectives. For example, a tax-exempt investor shouldn't be compared against a taxable benchmark.

Other characteristics that many feel are important to good benchmark construction include:

- *Measurable* - Performance can be calculated frequently
- *Specified in advance* – It can be constructed prior to the start of the measurement period

Regardless of the exact list of criteria for a good benchmark, a published index of unmanaged securities or asset classes is a better alternative than a universe comparison. Universe comparisons have too many drawbacks that lessen their effectiveness as the primary evaluation of investment performance. This is one reason benchmarking private equity is so challenging. There is no publicly available index of unmanaged assets representing the private equity market place, leaving investors to rely on universe

comparisons and other solutions. These solutions fall short of fulfilling the criteria of a "good" benchmark.

Private Equity Benchmarking Alternatives

There are two primary methods that investors use in an attempt to benchmark private equity portfolios:

- Opportunity cost solutions
- Commercially available private equity universe

These separate methods reflect two different objectives for which a private equity benchmark might be used: measuring the success of the strategic decision to invest in the asset class and measuring the effectiveness of the program's implementation within the available opportunity set. In the case of liquid asset classes, it is normally possible to use a single market benchmark for both purposes, but this is often not the case for an illiquid investment class such as private equity.

The 2005 Russell Alternative Investment Survey asked participants for their program's primary private equity benchmark, the responses looked like this:

1) 51% - using public market benchmarks (a number of different indexes)
2) 22% - using Venture Economics universe data
3) 24% - a combination of other methods
4) 3% - using no benchmark at all

There is not a clear industry standard. Even the use of the public market indexes includes a wide variety of benchmarks and methods. It is not unusual to see sponsors incorporate multiple measures to address both the asset allocation decision and implementation decisions, such as CalPERS has done with its Long- and Short-Term objectives.

Opportunity Cost: A Comparison to Public Market Returns

An opportunity cost solution is based upon the premise that the funding for the private equity allocation comes at the expense of another asset class, typically liquid equity. To assess if the private equity program (both the decision to allocate and the implementation) is successful, the primary hurdle becomes a comparison of the portfolio results against the proxy for the source of funds, i.e. a public markets index. If the private equity portfolio is doing better than the equity index, the program is deemed a success, if it is trailing the index, concerns are raised. Investors have acknowledged that private equity introduces additional risks beyond liquid equity, and for this reason will often add a return premium to the liquid market benchmark return. The premiums most often range from 200 – 700 basis points.

Investors using an opportunity cost method realize that this is not a true proxy for the private equity markets, and many have tried to make adaptations to improve the fit with

the private equity markets. A common modification is to smooth the equity market return over a number of years (5 – 10) to reduce the short-term volatility of the liquid markets. Unlike public markets, private markets do not trade continuously. Therefore, prices are assessed rather than dictated by actual trade data, resulting in a private equity return stream with dampened volatility. Another variation is creating a "shadow" index that is structured from public securities that match many of the characteristics of the private equity markets. Others have applied their own portfolio's cash flows to a liquid market benchmark's to create an internal rate of return for the public market benchmark. While these alternatives and variations may overcome some deficiencies, they can also introduce new concerns, not the least of which is additional complexity.

One limitation that requires mention is the actual method of calculation. Private equity partnerships are best measured by an internal rate of return calculation (IRR) while public equity benchmarks are calculated using a time-weighted return methodology (TWR). Over short-term time horizons this difference can cause significant inconsistencies. In practice, most accept this and are satisfied that a public market alternative will provide them with perspective of how the assets would have otherwise performed. Therefore, the technique provides a good gauge for evaluating the private equity program.

Universes: A Comparison to Peers

The other common methodology for benchmarking private equity portfolios is the use of a commercially available private equity universe. A universe (i.e. peer group) comparison is inferior to a true index comparison in that it is less investable, probably less representative, and certainly less objective. However, where no true index exists, good universe comparisons are an acceptable alternative. In particular, they offer a direct comparison with what others with similar goals are achieving; as such, they can be a good means of evaluating the implementation of an investment program.

While the most recognized universe is the vintage year comparisons provided by Venture Economics, there are a few other providers, including Cambridge Associates. Data is gathered from private equity partnerships in the marketplace and tracked by sector and vintage year. The vintage year comparison provides a more relevant comparison of funds that have existed for the same time period. Because the return characteristics of different vintage years are so different from one another, comparing private equity partnerships of different vintages can be very misleading and is best avoided.

When utilizing private equity universe backdrops, individual funds and portfolios are most often compared against the range of returns for a given vintage year. Portfolios finishing above the "median" outcome for the universe are considered good, while those below are considered trailing. Because the median private equity performance has historically been similar to the results one can achieve in the public markets, many target "first quartile" results for their private equity holdings. Other available universe measures include the average, capital weighted, and pooled cash flow returns. The pooled cash flow returns treat the entire universe as one portfolio, netting all of the cash

flows and valuations to provide a total return for the universe. This calculation is similar to how a plan sponsor reports a return for its entire portfolio.

The private equity universes are a useful source of data and information. They do the best job of describing the activity occurring within the markets, and provide perspective for how a portfolio is performing versus the backdrop of other funds. Unfortunately, they encounter many of the same limitations as liquid manager universes, including sampling and the reliance on manager reported results. This can cause significant differences in returns from two universes claiming to measure the same market. Universe vendor selection can have a great impact on a portfolio's relative performance. The following chart compares the returns of two different universe vendors and contrasts this to the differences found in liquid U.S. equity market indexes.

	Annualized Results – ending March 31, 2005			
PE Universe	One Year	Three Years	Five Years	Ten Years
VE Venture Capital	4.3%	-1.3%	-6.1%	25.5%
Cambridge VC	11.9%	-4.5%	-12.6%	42.3%
VE Buyout	18.6%	8.5%	2.4%	8.6%
Cambridge Buyout	22.4%	13.2%	3.3%	12.2%
US Equity Index				
Russell 3000	12.0%	3.7%	-2.5%	10.8%
DJWilshire 5000	12.6%	4.3%	-2.6%	10.7%
S&P 1500	11.8%	3.4%	-2.1%	11.1%
Sources: Venture Economics, Cambridge Associates, Russell, Wilshire, S&P				

Private equity universes vary far more than public market indexes, bearing out that they are more subjective and less representative of the true underlying opportunity set.

An additional limitation, unique to illiquid universes, is the issue concerning "residual value". Interim returns reported by private equity partnerships include actual cash flows and an embedded residual value. This value is provided by the partnership and is based upon an appraisal value. By their nature they tend to be smoothed, and create an artificial sense of lower volatility. Despite these recognized limitations, private equity universes are the best source of market information.

CalPERS Current Alternative Investment Management Program Benchmarks

CalPERS currently incorporates two benchmarks for its Alternative Investment Management (AIM) Program. The first measures the Long-Term Performance Objective of the program. It is comprised of the custom CalPERS Wilshire 2500 Index plus a 500 basis point return premium. The portfolio is expected to meet this target net of all fees and expenses. The calculation is smoothed over rolling ten-year periods to lessen short-term volatility and to be consistent with the average investment horizon of private equity investments.

The long-term benchmark fits in the category of opportunity cost (described above) as it reflects the asset class (Wilshire 2500) where the monies would otherwise be invested. It also addresses the required risk premium (500 bps) determined necessary to compensate the System for accepting the additional risks of investing in private equity. At the heart of this selection is the primary strategic objective of the AIM Program, "Enhance the System's long-term total risk adjusted return". Private equity's central role in meeting this objective is to provide returns in excess of the other asset classes. If the program limited itself to traditional liquid market opportunities, equity should have the highest return target. An asset class designated for increasing the System's total return should exceed the traditional highest returning asset. The long-term objective aids in the evaluation of the System's strategic decision to allocate to private equity.

The second measurement benchmark for the Program is the Short-Term Performance Objective. This measure was incorporated to reflect the relative immaturity of the CalPERS program and to recognize the significant difference in performance between young and mature private equity investments. The Program's partnership performance is compared to the Venture Economics young fund median return by vintage year, defining young funds as the first four years of a partnership. The goal is to exceed the median return of the universe over the most recent four years.

The Short-Term objective plays a number of important roles. It accounts for the j-curve performance pattern of private equity investments. It provides perspective on how well the Investment Staff is doing relative to the opportunity set of available private equity deals. It also serves as an aspect of the variable compensation benchmark for the Investment Staff. The Long-Term objective could not serve the first two purposes and would be difficult to incorporate in the third.

Russell believes the two-tiered methodology of CalPERS remains appropriate, given multiple objectives. This approach addresses the difficulty of trying to both capture the performance impact of exposing the System to private equity and measures the relative performance of the Investment Staff. It doesn't appear that there is one alternative available that can fairly measure all the objectives of the Program. Given this, Russell believes that CalPERS should maintain a two-tiered approach. However, the components of each should be reviewed and will possibly benefit from modifications.

Reviewing the Current Benchmark Composition

Long-Term Objective - Opportunity Cost Benchmark

The opportunity cost benchmark can be broken down into three components:

- Customized CalPERS Wilshire 2500 Index – representing the public market alternative
- 500 basis points of premium – reflecting the necessary hurdle to justify incorporating the additional risks and illiquidity of private equity

- Rolling ten-year period - reflecting the term of a market cycle and life of an investment

The Wilshire 2500 Index proxies the liquid U.S. equity market exposure of the System. The index reflects a broad market representation of the U.S. equity market opportunity set. If the only source of funds for the private equity program is the U.S. equity market, then this should remain the public market index used for the benchmark. However, the funds allocated to the private equity portfolio are sourced from both domestic and international equity. In this case, both should be represented. Based on the overall asset allocation policy which contains 66% equity (40% U.S. equity, 20% non-U.S. equity, and 6% private equity), it appears that the private equity exposure comes 4% from U.S. equity and 2% from non-U.S. equity, a two-thirds, one-third split consistent with the overall equity mix. For this reason, a better representation of the opportunity cost would be a composite benchmark of CalPERS' U.S. equity and non-US equity benchmarks (CalPERS Customized Wilshire 2500 Index and the customized CalPERS Financial Times Stock Exchange Index) weighted 2/3 and 1/3 respectively. The inclusion of international is more reflective of the current private equity portfolio which is currently comprised of approximately 20% non-domestic investments.

Assigning a 500 basis points return premium to the liquid markets equity index is well within the normal range of premiums used by sponsors. Based upon Russell's experience with clients and private equity advisors, the majority of premiums are between 200 to 700 bps with a concentration in the 300 to 500 bps range. There is no magic to selecting a premium level, as the decision is generally based upon the amount of additional return the investor feels is necessary to justify the additional risks occurred. At a very basic level, one could view a return exceeding the liquid equity markets as a measure of success since the primary goal of private equity is to boost plan returns.

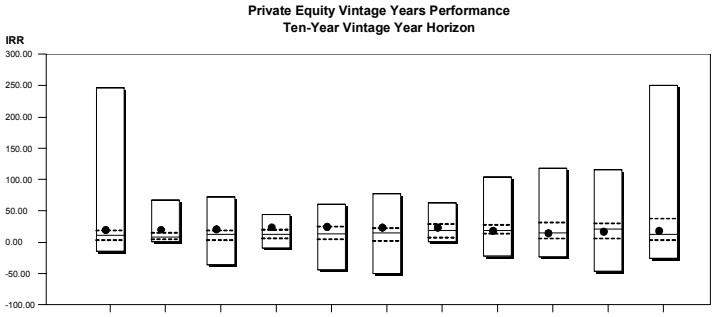
It is not a given that private equity will outperform liquid equity markets. The twenty year periods ending December 2004 is a good example of this. The U.S. Private Equity Market topped the U.S. liquid equity market by only 80 basis points per year.

Asset Class	Annualized Periods Ending 2004		
	Five Years	Ten Years	Twenty Years
US Private Equity	1.5%	12.7%	13.8%
US Equity Market	-1.2%	12.0%	13.0%
Source: Venture Economics and Russell			

Naturally, this will vary over time with periods of both outperformance and underperformance by the private equity markets relative to the liquid markets. However, in general, the long-term average returns of the private equity markets look similar to the results of the liquid equity markets. Understanding this, a 500 basis points return premium suggests a significant amount of reward from active management and should be reviewed for reasonableness.

Russell considered a number of factors in reviewing the return premium. The first factor was reviewing how the current 500 basis points premium performed against the private equity universe. Russell constructed a rolling ten-year US equity benchmark (Russell 3000 Index) and added 500 basis points over each annualized horizon. Comparing this to the vintage year performance of the Venture Economic Private Equity Universe over ten-year horizons (example: 1985 vintage funds performance through 1994), it is evident that during some periods that 500 basis points was a significant hurdle to achieve during that horizon, but during others it was rather modest. The chart below shows that this benchmark would have been a top quartile performer within the private equity universe for the first six vintage years examined (1985-1990), but looks average to below average for some of the later year vintage comparisons. Hence, based upon historical experience, there is not definitive support for or against a return premium of 500 basis points.

Opportunity Set Benchmark vs the Universe for Ten-Year Horizons



	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Maximum	243.9	64.7	70.3	42.6	58.5	74.9	61.7	102.4	116.4	113.0	247.8
25th	16.8	12.7	16.9	17.5	23.1	20.7	26.7	25.6	29.7	28.2	35.8
Median	9.2	7.1	10.2	10.2	11.2	13.5	16.7	17.3	13.0	18.7	10.8
75th	1.4	3.1	2.0	4.0	2.8	0.1	5.6	11.2	3.6	3.8	2.0
Minimum	-16.3	-1.3	-37.8	-10.7	-45.5	-52.0	-1.2	-23.4	-25.0	-47.9	-28.3
● US Equity + 5%	19.0	19.4	19.9	22.9	23.5	22.7	22.4	17.7	13.9	15.8	17.0

Source: Venture Economics for Private Equity

Russell

The next step in reviewing the premium entailed a comparison of risk versus unit of return. The Sharpe Ratio is a commonly used term to measure a unit of return per unit of risk. A historical perspective of returns and volatility is all one needs to compare Sharpe Ratios of different investments. Unfortunately, the standard deviation of private equity markets is difficult to measure and thus estimates were used for this exercise. To accomplish this we used the current Russell estimate of private equity volatility and applied it along with actual historical liquid markets results and private equity returns. To add to this analysis,, we also incorporated Russell's long-term capital market return forecasts to project a future Sharpe Ratio for U.S. equity and private equity. Thus, we will have a historical and projected Sharpe Ratio comparison between liquid and private equity.

The equation for the Sharpe Ratio is:

- Sharpe ratio = (portfolio return – risk free rate) / portfolio standard deviation

Russell calculated the following Sharpe Ratio for the U.S. equity market from 1980 – 2004 based upon quarterly returns of the Russell 3000 Index (the period corresponds with the available private equity market return history).

- .44 = (13.2% - 5.7%) / 17.1%

For private equity to achieve a comparable Sharpe Ratio for this period, it would have needed to produce a return of 19.6% based upon the actual risk-free return and Russell's assumption for private equity volatility. This suggests a return premium of 6.4% over liquid equity during this 25 year horizon.

- .44 = (19.6% - 5.7%) / 31.9%

Unfortunately, private equity markets returned only 14.0% for this period, producing a Sharpe Ratio of 0.26. This 80 basis points of premium (14.0% - 13.2%) is consistent with the 80 bps that was experienced during the 20 years ending 2004.

Those results provide the historical perspective for the period 1980 - 2004. Since this is a forward looking exercise, consideration for the forecasted behavior of the markets also should be incorporated. Using Russell's forward looking, long-term capital markets forecasts for U.S. equity and cash (risk-free), one gets the following Sharpe Ratio for U.S. equity.

- .23 = (8.7% - 4.5%) / 18.1%

To achieve a comparable Sharpe Ratio for private equity in the future, it appears that a return of 11.7% is necessary to achieve the same Sharpe Ratio.

- .23 = (11.7% - 4.5%) / 31.9%

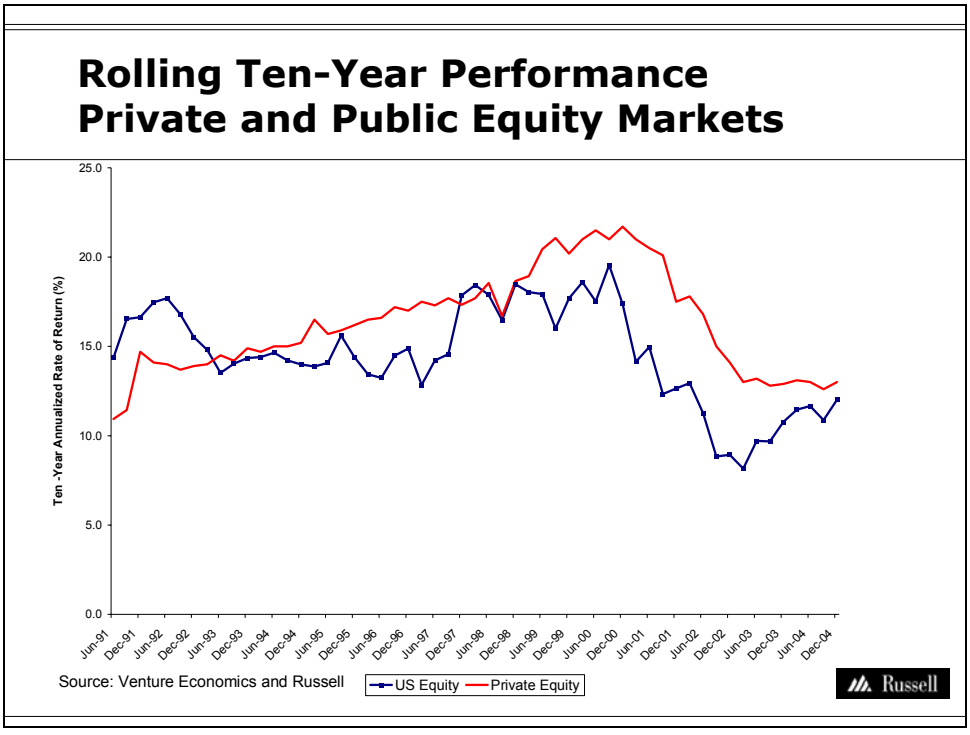
This suggests a forward looking return premium of 300 basis points, lower than the historical and lower than the current 500 basis points.

Being there is not a consensus for the appropriate premium based upon history and future projections, consideration of current market conditions should also play a role in this exercise. The private equity market is becoming more competitive with a growing interest from institutional investors. The higher cash flows into the market creates an environment where purchase multiples are above historical norms. Unfortunately, higher purchase multiples typically lead to lower performance returns to investors. Taking this into account, a more modest return expectation should be considered, and thus, a lower return premium for the benchmark.

Given current market conditions, as well as Russell's capital market forecasts, we suggest a slightly lower return premium for the benchmark. Based upon the risk/return profile of our market projections, a target of 300 basis points appears fair and will still compensate the System for accepting the additional risks of private equity.

The last element of the opportunity cost benchmark is to smooth the returns over a ten-year rolling period. This process reduces the short-term volatility that is captured by liquid market equity indexes and not explicitly expressed by private equity investments. The downside to this method is that it is not intuitive or easily calculated over shorter time periods without a spreadsheet. But, it is transparent and can be calculated by anyone with the appropriate tools. The benefits of smoothing outweigh the increased complexity.

The proper horizon of the smoothing period can be debated. Most investors who smooth the benchmark use a range between five and ten years. Given the normal duration of private equity investments, ten year smoothing is easily supportable. When comparing the rolling ten-year horizon return of the private equity market to the liquid equity market, the selection appears to be a good fit. A more intermediate term of 3 – 5 years would often reflect periods when the liquid and public markets are thus more out of sync and make comparisons difficult.



Long-Term Objective: Summary of Recommendations

To summarize the Opportunity Cost aspect of the AIM Program benchmark:

- The liquid equity market index should be addressed. Given the source of funds is actually a mix of the U.S. and the non-US equity allocation, the benchmark should reflect this mix
- The 500 basis point return premium is within the normal range, but an adjustment to 300 basis points may be a more appropriate hurdle going forward
- The rolling ten-year horizon should remain in place

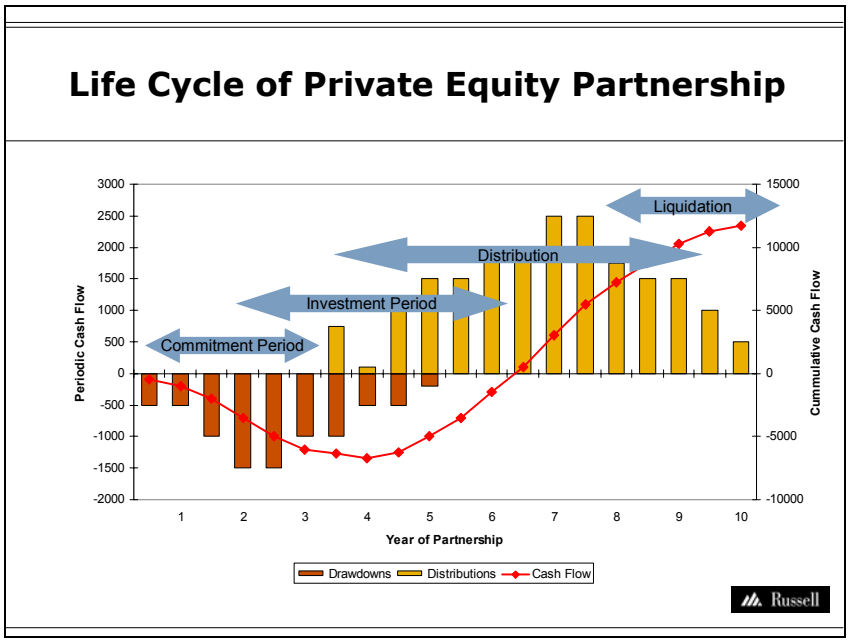
Short-Term Objective – Private Equity Universe Comparison

The Short-Term Objective of exceeding the Venture Economic young fund median returns by vintage year covering the most recent four years attempts to accomplish the following:

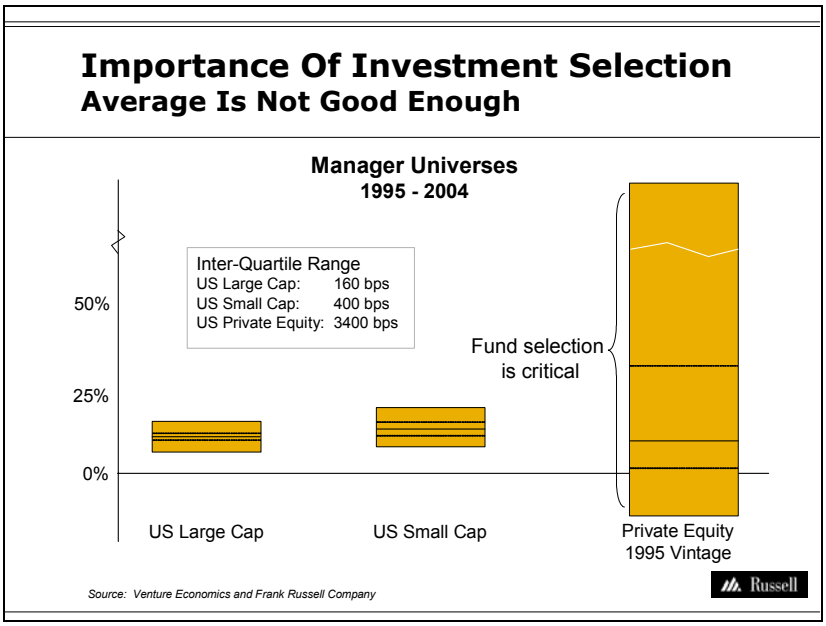
- Recognize the relative immaturity of the AIM Program
- Address the j-curve return pattern of private equity investments and its impact of the Program's performance
- Quantify the impact of the Investment Staff's implementation within the context of the universe of opportunities available to them in the private equity market
- Act as a Staff performance benchmark for variable compensation purposes

Incorporating the short term benchmark is recognition that the majority of CalPERS' cash contributions have been invested during the prior five to six years. Because the performance of different vintage years of private equity investment can be so dissimilar, the short term benchmark should reflect as closely as possible the composition of investments of comparable vintage.

The concept of the j-curve is also important to assessing the returns of a private equity program. In essence, it means that early returns will be negatively biased regardless of activities in the liquid markets. As the chart at the top of the following page demonstrates, it is not typically until the fourth or fifth year before an investment starts generating positive cash flows and investors start experiencing positive results. For this four to five year stretch, the portfolio will have little correlation with the movements of the liquid equity markets and a proxy based upon a liquid market index will have little relevance.



Just as important as understanding the cash flow and return patterns within private equity, is appreciating the range of potential outcomes. This range of results addresses the third and fourth reason for using a private equity universe benchmark to assess performance. As previously mentioned, over long periods private equity and liquid equity have performed similarly. However, unlike liquid equity, one cannot passively invest a private equity portfolio in an attempt to get the market return. Portfolios must be active and the range of active results can be staggering. The following chart demonstrates this by displaying the ten year annualized results of a large cap U.S. equity manager universe, a small cap U.S. equity manager universe, and the Venture Economics 1995 vintage year private equity universe all ending on December 31, 2004.



For this ten year window ending December 2004, the average return for each of the universes is fairly close. However, when you examine the range of results, it highlights the importance of active management in private equity. The difference between a first and third quartile result in U.S. Large Cap equity is 1.6% a year, a meaningful difference if you are on the short end, but one that you can recover from. The small cap range is, as most would expect, a little larger at 4% per year. Contrast this, however, to the range for private equity investments. The difference between a first quartile and third quartile return in private equity was 34% per year over ten years for the 1995 vintage year universe. That is more than eight times as large as the variation in small cap returns and twenty times the variation in large cap returns. A third quartile result not only finishes well below the median or first quartile private equity results, it falls below the bottom of the liquid equity universes. Results will vary over time, but the relationships remain the same. Not only is active management impossible to avoid in this asset class, the penalty for poor active management is much more severe than other areas.

The existence of the j-curve performance pattern and the range of potential returns make it necessary to include a universe relative component within the private equity performance analysis. These factors will cause the private equity portfolio to have periods when it looks much different than the public market benchmark, and the only way to evaluate implementation results will be against a peer backdrop. However, as the AIM Program matures, it is questionable whether the peer relative performance needs to be a *short-term* objective. The current short-term objective has been appropriate as the portfolio was in the early stages of ramping up to meet its allocation target. Now as the portfolio is starting to mature, a longer view starts to become possible.

Short-Term Objective: Summary of Recommendations

We recommend the following for the peer relative performance measurement:

- Maintain the use of the Venture Economics Universe data
- Utilize the private equity universe as describe by Venture Economics
- Begin the measurement period with the 1998 vintage year, and consider all composite vintage year results subsequent to 1998
- Utilize the pooled cash flow return, not the median return as the hurdle

The reasoning behind these recommendations is as follows:

Venture Economic is the leader in data and universe information for the private equity markets. While the universes aren't perfect, CalPERS will not find a better source for providing private equity market information for benchmarking purposes.

For the peer comparison, we recommend utilizing the Venture Economics description of the private equity universe without attempting to reallocate it to reflect the underlying AIM Program portfolio. Although some organization will try to tailor a private equity benchmark to look more like the underlying portfolio (for example, more venture capital in the mix), any decision to invest away from the general allocation of the market is a

decision for which Investment Professionals should be evaluated. At this point, the Venture Economics Universe is the best reflection of the opportunity set and should be the peer backdrop upon which the private equity program is measured.

The use of 1998 as the starting point for measurement is due to the fact that it represents the beginning of an investment ramp up period for the private equity program. Approximately 50% of the System's private equity commitments (as measured by dollars committed) occurred during the years 1998 through 2001. This is a significant investment period for the program and should be captured in a performance measured exercise.

Now that there are a number of years of significant investment from the AIM program, a better universe comparison would be across vintage years in a portfolio context. With the maturing of the program, it is also less appropriate now to continue to compare only to the "young" funds in the Venture Economics database, as has been done up to this point. For this reason we recommend that, beginning with the vintage year 1998, CalPERS start employing "The Composite Approach" as it is described by Venture Economics. This approach goes beyond the process of comparing individual vintage years and takes a portfolio approach to performance measurement. The Composite Approach begins with an initial vintage year and combines the subsequent vintage year investments up to the current year to create a return measure. For example, starting with 1999 there will be a universe return for 1999 – 2004 which is comprised of all the investments for that five year window. CalPERS can compare the return for its total program against the universe return for that same period. Then there will be a universe return for 2000 – 2004, etc. It creates a universe benchmark in the pattern of an investor that starts a program one year and continues to invest year after year. It incorporates the higher returns of more mature funds and the j-curve pattern of more recent vintages. CalPERS can compare the AIM Program over the same time frames, creating one additional return horizon with each passing year. The benchmark will continue to mature as the CalPERS program continues to mature.

The pooled universe return is a measurement calculated by Venture Economics that captures the entire universe as one market investment. This is accomplished by netting all of the individual partnership cash flows and valuations together and then using this information to calculate a return for the universe. A major advantage is that pooling takes into account the *scale* and *timing* of cash flows of both large and small investments. The return stream that this creates should be similar to the return methodology used by investors with multiple private equity investments across multiple years, such as CalPERS. This pooled return can be quite different than the median universe result that many funds target, but it is a more accurate reflection of the universe results as a whole.

Combining the composite and pooled methodology will provide the best picture of the returns experienced by the universe over a given time horizon. For example, the pooled composite from 1999 – 2004 will create a universe return for all private equity funds vintage years 1999 – 2004 that accounts for timing and size of cash flows and current

reported valuations of the partnerships. CalPERS can compare its portfolio results over the same horizon, including the same vintage year funds.

We end this section with a brief comment about the use of the universe benchmark for the purpose of assessing staff variable compensation. There are a great many other considerations that would need to go into a full performance appraisal and compensation review (for example, if certain professionals have direct influence over only one segment of the portfolio, there are a number of choices of how to quantify their contribution). This report is not a compensation review exercise, and we have not set out to consider those other implications. As such, any comments we have made on the use of the short term benchmark for staff assessment purposes are purely incidental to the subject of this note.

Summary Benchmark Recommendation

Russell recommends the following benchmark methodology for the CalPERS Alternative Investment Management Program:

- Long-Term Objective
  - Outperform the Composite Liquid Equity benchmark (2/3 CalPERS custom Wilshire 2500 Index – 1/3 CalPERS custom FTSE Index) plus 300 basis points risk premium annualized over rolling ten year periods
- Peer Universe Objective
  - Outperform the Pooled Venture Economics Private Equity Universe over Composite Universe Periods starting with Vintage Year 1998